

# NASA TECH BRIEF



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## Reflective Insulator Layers Separated by Bonded Silica Beads

### The problem:

To eliminate the use of separate, bulky nonconductive sheets in multilayer reflective insulation. Previously used sheets of fiberglass and similar materials are very heavy and present problems in fabrication.

### The solution:

Bonding nonconductive separators to the metallic reflecting sheets prior to fabrication. This eliminates the need for separate nonconductive sheets and simplifies the fabrication process.

### How it's done:

A layer of small, closely spaced hemispherical beads of relatively pure silica, silicate, or other oxide is applied to the reverse side of each metallic reflecting surface. Spacing and height of the beads are related to reflector thickness. Any desired number of treated reflectors may then be joined by standard methods to form multilayer reflectors tailored to the application.

### Notes:

1. Lithographed aluminum foil is useful for cryogenic applications, while nickel sheets flame-sprayed with aluminum oxide function well at temperatures approaching 2200°F.
2. In one application, 15 layers of foil treated with silica beads have a total thickness of only 0.0075 inch but are as efficient as 0.875 inch of conventional insulation.
3. Heavy-gauge reflectors may be used in those applications where weight is not a consideration. In weight-sensitive applications, titanium sheets to a thickness of 0.0001 inch may be employed.
4. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer  
Manned Spacecraft Center  
P.O. Box 1537  
Houston, Texas, 77001  
Reference: B66-10070

### Patent status:

No patent action is contemplated by NASA.

Source: Nelson T. Zuver, Jr.  
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